Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Authorizing Permissive Use of the "Next Generation" Broadcast Television Standard	)	GN Docket No. 16-142
	)	

COMMENTS OF SHURE INCORPORATED
IN RESPONSE TO FURTHER NOTICE OF PROPOSED RULEMAKING

Shure Incorporated ("Shure"),[1] by its undersigned counsel, hereby submits these comments in response to the Federal Communications Commission ("FCC" or "Commission") Further Notice of Proposed Rulemaking ("FNPRM") in the above-captioned proceeding,[2] and in particular, the proposal to allow full power broadcasters to use unassigned channels in the television broadcast band as dedicated transition channels for the purpose of their trials of ATSC 3.0 service (the "Vacant Channel Proposal").[3] Shure implores the Commission not to adopt this proposal. The Vacant Channel Proposal would disrupt years of careful planning and investment for the UHF spectrum band by wireless microphone manufacturers based on rules developed in a series of prolonged and difficult multiparty proceedings which achieved a reasonable balance of interests to minimize harm and disruption to important existing uses to the greatest extent possible. This proposal, if

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[1] Shure is the leading U.S.-based manufacturer of high-quality wireless microphones and other professional audio products classified as low-power auxiliary devices authorized under Part 74 of the Commission's Rules to operate on a secondary basis in the TV broadcasting spectrum.

[2] *In the Matter of Authorizing Permissive Use of the "Next Generation" Broadcast Television Standard*, GN Docket No. 16-142, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 9930 (2017) ("FNPRM").

[3] FNPRM at ¶ 126.

adopted, would foreclose vital access to the UHF Television ("TV") band spectrum for wireless microphone users[4] who rely on UHF spectrum to meet increasing demands for high quality wireless microphone operations. The proposal is contrary to previously expressed intentions of the Commission and is beyond the scope of the joint petition for rulemaking ("Petition") that initiated this proceeding.[5]

I. THE VACANT CHANNEL PROPOSAL SHOULD NOT BE ADOPTED BECAUSE THE COMMISSION HAS ALREADY DRAMATICALLY REDUCED UHF SPECTRUM AVAILABLE FOR WIRELESS MICROPHONE OPERATIONS THEREBY MAKING FURTHER REDUCTIONS WHOLLY UNTENABLE

As Chairman Pai has recognized, "wireless microphones serve important purposes. They enable broadcasters and other video programming networks to meet the needs of consumers by covering breaking news and other live events. And they are critical tools for businesses and productions across the country."[6] Wireless microphones have successfully operated, on a secondary basis, on unassigned channels in the TV spectrum for decades. A proposal that allows broadcasters access to vacant channels in addition to their already allocated spectrum rights would deny valuable use by other users that would make efficient use of this spectrum and are being displaced as a result of the Incentive Auction.

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4 "Professional audio" microphones are used as a medium for transmission of multimedia and artistic content, and have corresponding and unique performance requirements. They must capture full audio range, have less than three (3) milliseconds of transmission latency (for some applications less than one (1) millisecond), and have reliability that meets or exceeds the expectations of a wired microphone user. These performance requirements necessitate a wider emission and require adequate, clean spectrum.

5 *See In the Matter of Authorization of Next Generation TV For Permissive Use as a Television Standard*, Joint Petition for Rulemaking of America's Public Television Stations, the Advanced Warning and Response Network Alliance, the Consumer Technology Association, and the National Association of Broadcasters, GN Docket No. 16-142, at 3 (filed April 13, 2016) ("Petition") ("The Petition does not ask the Commission to give broadcasters additional spectrum to roll out Next Generation TV and does not seek any changes to the current DTV standard.").

6 *In the Matter of Promoting Spectrum Access for Wireless Microphone Operations, et al*., GN Docket Nos. 14-166, 12-268, Report and Order, Statement of then-Commissioner Ajit Pai, FCC 15-100 (rel. Aug. 11, 2015) ("*2015 FCC Wireless Microphones Order*").

While wireless microphone use has grown considerably in recent decades, and risen most dramatically in the last several years, the demand for spectrum for wireless broadband uses has led the Commission to repurpose a significant amount of spectrum previously available for wireless microphones to high-power wireless mobile services and, on a shared basis, to low-power unlicensed devices ("white space devices" or "WSDs"). Accordingly, in a relatively short period of time, the Commission has implemented measures that have rapidly squeezed wireless microphone operations into significantly less spectrum.

Shure has participated extensively in various regulatory proceedings grappling with these competing spectrum demands, beginning with the digital TV transition starting more than two decades ago, the introduction of unlicensed WSDs in the TV band, the migration of wireless microphones out of the 700 MHz band, the examination of new supplemental frequency bands particularly for licensed professional wireless microphone users, the repurposing of 600 MHz TV broadcast spectrum for high power wireless mobile services, and the resulting repacking of TV stations following the Incentive Auction.[7] This reduction in available spectrum makes it increasingly likely that in the near future there will not be

[7] *See, e.g., Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 25 FCC Rcd 643 (2010); *Unlicensed Operation in the TV Broadcast Bands, Additional Spectrum for Unlicensed Devices below 900 MHz and in the 3 GHz Band*, Second Memorandum Opinion and Order, 25 FCC Rcd 18661 (2010) ("*2010 Second Memorandum Opinion & Order*"); *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567 (2014); *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap, Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, ET Docket No. 14-165, GN Docket No. 12-268, Notice of Proposed Rulemaking, FCC 14-144 (rel. Sept. 30, 2014) ("2014 FCC Part 15 NPRM"); *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands et al*., ET Docket No. 14-165, GN Docket No. 12-268, Report and Order, FCC 15-99 (rel. Aug. 11, 2015) ("*2015 FCC Part 15 Order*"); *In the Matter of Promoting Spectrum Access for Wireless Microphone Operations, et al.*, GN Docket Nos. 14-166, 12-268, Notice of Proposed Rulemaking, FCC 14-145 (rel. Sep. 30, 2014) ("*2014 FCC Wireless Microphones NPRM*"); *2015 FCC Wireless Microphones Order*.

adequate wireless microphone support for larger-scale productions [8] unless the Commission takes affirmative steps to preserve a reasonable amount of UHF spectrum.[9] Against this background, the proposal to allow broadcasters to dedicate unassigned TV channels for their use as transition channels is untenable. If adopted, the proposal will significantly reduce the relatively small amount of UHF spectrum still available for wireless microphone operations, jeopardizing existing and future operations in this sector.

A. UHF Television Broadcast Bands Are Vital to Meet Increasing Demand for Professional Wireless Microphone Operations Serving Productions in a Wide Range of Sectors

Today, wireless microphones play a critical role in countless productions important to many aspects of American life.[10] Wireless microphone use has grown rapidly as consumers consistently demand higher quality productions across a broad range of activities experienced live and/or delivered through programming distributed via online platforms, FCC-licensed broadcasters, cable TV, film, and other media. Wireless

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[8] Just a few examples of larger scale events that require many wireless microphones include major news events such as the Democratic and Republican political conventions, inaugural events, crisis and disaster coverage, major sporting events, such as NFL games, major golf and tennis tournaments and NASCAR races, entertainment events, such as July 4th celebrations, Grammy, Oscar, and other major award shows, half-time shows, large music festivals, corporate events, such as major product launches and large business conventions, etc.

[9] While Shure strongly supports the Commission's actions that create the potential that spectrum in other bands, *e.g.*, 900 MHz, 1.4 GHz and 7 GHz, can supplement the spectrum currently available for wireless microphone operations, the availability of that spectrum will not compensate for the dramatic loss of UHF spectrum resulting from recent FCC action at time when consumer demand for wireless microphone-supported productions is soaring.

[10] These productions include, for example, major broadcast events (*e.g.,* the national political conventions and campaign coverage, the upcoming Grammy and Oscar awards shows, etc.), major music productions (*e.g.,* the 2017 Coldplay tour), theater (*e.g.,* matinee and nightly shows on Broadway and Cirque du Soleil in Las Vegas and elsewhere), sports (*e.g.*, 2018 NFL Super Bowl and play-off games, college basketball) productions, large houses of worship (*e.g.,* Lakewood Church, Second Baptist Church), business conventions (*e.g.,* 2018 CES) and major product launches. These and similar events occur weekly and sometimes daily and are extremely wireless-microphone intensive. In some cases, hundreds of wireless microphone channels are necessary to support such productions.

microphones provide critical support to a wide range of sectors in which the public has come to expect and demand extremely high-quality audio, including TV broadcasting, news casting, live music, theater, sports, religious, civic and academic institutions.[11]

Most wireless microphone operations and virtually all of professional wireless microphone operations have historically operated in the UHF television bands.[12] As the Commission has recognized, the necessity of the UHF band for microphone operations is attributed to several factors including "favorable propagation conditions, the signals do not suffer significantly as a result of body loss, antenna sizes are manageable, and there is relatively lower power consumption leading to longer battery life – all of which can be helpful for many wireless microphone purposes."[13] While the wireless microphone community has made great strides in advancing spectrally efficient technologies, nothing can compensate for the loss of two thirds of the UHF channels. As a practical matter, the newly identified spectrum outside the TV Bands (900 MHz, 1.4 GHz, and 7 GHz) is of limited utility in the short and medium term, in part, because there is little to no wireless microphone equipment commercially available to operate on those frequencies.[14] In light of the 600 MHz transition currently underway, in which thousands of wireless microphones are being discarded and replaced by equipment that operates in the remaining TV band, foreclosing wireless microphones from remaining vacant channels below 608 MHz would thus be catastrophic.

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11 It is noteworthy that wireless microphones are also an integral component to much of the multimedia content streamed or webcast through broadband connections to fixed broadband and personal/portable devices.

12 47 C.F.R. §§ 74.801-74.882.

13 *2014 FCC Wireless Microphones NPRM*, ¶ 17.

14 *See* GN Docket Nos. 12-268, 14-166, ET Docket No. 14-165, Reply Comments of Shure, Figure 1 (filed October 16, 2017) (identifying limitations on spectrum "available" for wireless microphone operations outside of the TV bands).

B. Wireless Microphone Users Have Endured Significant Hardships Resulting from Repeated Rule Changes Reducing Available UHF Spectrum and Should Not Be Subject to Further Harm

Following the completion of the DTV transition and the reallocation of the 700 MHz band in 2010, wireless microphone users purchased TV band equipment in reliance on Commission rules that provided for two reserve channels free from white space device interference and an FCC process that allowed for registration, on a case-by-case basis, to protect critical applications from interference.[15] The Commission's subsequent decisions to eliminate both the unlicensed database registration pathway and the two reserved wireless microphone channels, along with the 600 MHz band Incentive Auction and TV band repacking, dealt a further blow to wireless microphone operators facing demands for professional-grade audio requiring interference protection in the TV band.[16] Now, even before the *prior* changes have been fully implemented, the Commission proposes to adopt yet another significant reduction in UHF spectrum available to wireless microphones. Blocking wireless microphones from critical access to vacant channels in the TV bands would impose substantial burdens on microphone operators who would be faced once again with new rules that further limit access to UHF frequencies.[17] Foreclosing wireless microphone access to what might be the last vacant channel in major locations will impinge on productions where no other high performance, interference free spectrum is available and may mean that some productions can no longer be supported with wireless

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15 *See 2010 Second Memorandum Opinion & Order*, ¶¶ 31-32 (2010). Many of these users were purchased their 600 MHz equipment as a result of the Commission's decision to prohibit wireless microphone operations in the 700 MHz band. cite *See* ET Docket No. 14- 165, GN Docket No. 12-268, Comments of Shure Incorporated at 38 (filed Feb. 4, 2015).

16 *See 2015 FCC Part 15 Order*, ¶ 266 (2015).

17 *See* ET Docket No. 14- 165, GN Docket No. 12-268, Comments of Shure Incorporated at 38 (filed Feb. 4, 2015).

microphones. Further, constant changes of spectrum rules and their corresponding impact on microphone use rights injects significant uncertainty in the equipment manufacturing sector, making it impossible to plan technologies effectively and efficiently direct investments in research and development, supply chain and production, and end user technical support.

II. SHURE OPPOSES THE PROPOSAL TO ALLOW FULL POWER BROADCASTERS TO USE VACANT CHANNELS AS DEDICATED TRANSITION CHANNELS

The Commission seeks comment on the extent to which it should allow full power broadcasters to use vacant channels in the television broadcast band to facilitate the transition to ATSC 3.0 service.[18] The Petition[19] that initiated this proceeding proposed to "allow television broadcasters to use the Next Gen TV transmission standard on a voluntary, market-driven basis."[20] The Petition did not seek access to additional spectrum to deploy Next Generation services, and in fact, expressly clarified that "no additional spectrum [was] required or requested"[21] and that "broadcasters [would] use market-based solutions to introduce this enhanced capability on existing spectrum."[22] The Vacant Channel Proposal is an unjustifiable expansion of broadcasters' existing spectrum rights and disregards the Commission's expressed intent to utilize these channels to preserve the ability for wireless microphones and WSDs to operate in the TV band following the Incentive Auction repacking. The proposal fails to consider the numerous proceedings and

18 FNPRM at ¶ 126.

19 Petition, *supra* n. 5.

20 FNPRM at ¶ 5.

21 Petition at iii.

22 Petition at 3.

policy decisions and the extensive record that balances the needs of the various classes of users that operate within the TV band.

A. The Proposal is an Unwarranted Expansion of Broadcasters' Spectrum Rights and Ignores the Needs of Wireless Microphones Operating in the TV Bands

The Vacant Channel Proposal disrupts years of difficult public proceedings carefully balancing competing needs of services that operate within or adjacent to the TV band, including Public and Private Mobile Services, Broadcast Auxiliary Services, licensed low power auxiliary stations, as well as unlicensed wireless microphones and unlicensed TV white space devices.[23] It is not acceptable for the Commission to radically alter the regulatory scheme in such a way as to fundamentally undermine wireless microphone designs and deployments and, in turn, disrupt the many sectors that rely on them.

Moreover, this vacant channel proposal is impractical. For example, in large urban areas, only a small number of channels are available, and not every market will have sufficient vacant channels available to accommodate all broadcasters, which would result in disparate treatment of that class of licensees. In addition, although One Media asserts that access to the vacant channels would be "temporary" to facilitate deployment of ATSC 3.0[24] it fails to define the duration within which the transition would be completed. By some estimates, this proposal could result in blocking valuable spectrum access "for many years, if not more than a decade," given that no ATSC 3.0-compatible televisions are accessible to U.S. consumers at present.[25]

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[23] *See supra* n. 7.

[24] *In the Matter of Authorizing Permissive Use of the "Next Generation" Broadcast Television Standard*, GN Docket No. 16-142, Comments of ONE Media, LLC at 14 (May 9, 2017).

[25] *In the Matter of Authorizing Permissive Use of the "Next Generation" Broadcast Television Standard*, GN Docket No. 16-142, Reply Comments of Microsoft Corporation at 4 (filed June 8, 2017).

B. The Proposal Disregards the Open Proceeding Proposing to Preserve a Vacant Channel for White Space Devices and Wireless Microphone Use

One Media's support for allowing allow full power broadcasters to use vacant channels is also inconsistent with the Commission proposal to preserve, at a minimum, one vacant channel in the UHF band in the Incentive Auction repacking process for wireless microphones and white space devices, "given the importance of white space devices and wireless microphones to business and consumers."[26] Shure has been actively engaged in this proceeding and appreciates the Commission's reaffirmation in that NPRM that wireless microphones serve a critical and irreplaceable role in the creation of the dynamic content driving the demand for broadband connectivity.[27]

Since the introduction of white space technology and the implementation of the first Commission-approved geolocation database in TV band spectrum, wireless microphones had been able to rely on two "reserved" broadcast television channels nearest to Channel 37 under the Commission's soon to be superseded rules.[28] These reserved channels served as a home for high-priority wireless microphone operations, including, for instance, "on-air" talent at broadcast and streamed live events, as well as for itinerant electronic news-gathering crews that cannot rely on database registration for protection.

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[26] *In the Matter of Amendment of Parts 15, 73 and 74 of the Commission's Rules to Provide for the Preservation of One Vacant Channel in the UHF Television Band for Use by White Space Devices and Wireless Microphones*, *et al.*, Notice of Proposed Rulemaking, MB Docket No. 15-146, GN Docket No. 12-268, FCC 15-68 (rel. Jun. 16, 2015) (*"Vacant Channel NPRM*").

[27] The Commission specifically recognized that wireless microphones "'provide many important functions that serve the public interest' by playing 'an essential role in enabling broadcasters and other video programming networks to serve consumers' by 'significantly enhanc[ing]' event productions in a variety of settings,' and by 'creating high quality content that consumers demand and value, contribut[ing] substantially to our economy.'" *Vacant Channel NPRM* at ¶ 10 (citations omitted).

[28] *See Unlicensed Operation in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, ET Docket No. 04-186, 23 FCC Rcd 16807 (rel. Nov. 14, 2008).

The preservation of vacant UHF channels for wireless microphone use is, by no means, a complete replacement for dramatically reduced access to critical UHF spectrum including the discontinued interference free reserve channels previously available to wireless microphones in each market. However, the continued availability of vacant/shared UHF channels would provide professional wireless microphone users with a modicum of reliable, interference free spectrum critical to meeting the existing and growing demand for wireless microphones.

II. CONCLUSION

Shure respectfully urges the Commission not to adopt the Vacant Channel Proposal set forth in this proceeding as it forecloses wireless microphone users from vital access to the TV band spectrum, which is necessary to meet increasing demands for high quality wireless microphone operations. Adoption of the Vacant Channel Proposal would be catastrophic to wireless microphone operations and contrary to the expressed intentions of the Commission.

Respectfully submitted,

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